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EXAMINER	
ADDIE, RAYMOND W	

ART UNIT	PAPER NUMBER
3671	

DATE MAILED: 05/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/695,200	ZACHMAN ET AL.	
	Examiner	Art Unit	
	Raymond W. Addie	3671	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 March 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claim 2 is objected to because of the following informalities:

Claim 2 recites the method step of "measuring a desired grade with the gravity-based cross slope sensor; and storing the desired grade in memory of the control system". That does not define the desired grade being measured and stored. As written, it appears as though there is no limit to the various different "desired grades" that can be measured and stored. However, the specification, particularly page 3 lns. 10-20 only provides that "the desired grade of the cross slope sensor is measured and stored in memory of the tool's control system...That is, the cross slope sensor provides a relative measurement of the interrupted laser receiver which, when coupled with the absolute measurement of the uninterrupted laser receiver, provides an estimate of the absolute position of the interrupted laser receive(r)".

Hence, it is clear that only the cross-slope of the sensor itself, as it relates to the cross-slope of the screed head, is the desired grade being measured and stored; and does not include measuring the grade of the soil at the construction site receiving the concrete being leveled. Hence, the cited phrase from claim 2 should be --measuring the current transverse grade of the gravity-based cross slope sensor; and storing said grade in a memory device of the control system.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hohmann, Jr. # 5,556,226 in view of Clegg # 4,807,131 and Burgin # 3,816,937 discloses an automated laser aligned leveling screed and method of use comprising:

Controlling movement of individual, hydraulically moveable ends (17, 2nd end not numbered) of a screed head (15) so as to maintain a substantially horizontally-level, elevational position between each end of the screed head (15) and an elevational reference (59, 61).

Providing a control system (67) controlling the hydraulically moveable, 1st and 2nd ends of the screed head.

Providing a pair of laser receivers (51, 53) to the screed head (15), in communication with the control system (67).

Setting the pair of laser receivers (51, 53) in an appropriate dead band with the elevational reference. See col. 5, lns. 43-54.

Detecting a "column block" situation, wherein at least one laser receiver (51, 53) is obstructed from the elevational reference (59), and maintaining the screed head (15) in a substantially horizontally level orientation. See col. 3, ln. 1-col. 5, ln. 67.

What Hohmann, Jr. does not disclose is maintaining the screed head (15) in an orientation approximately parallel with a desired transverse slope, such as is needed in banked curves on roads and drainage sloped in concrete slabs and floors. However, Clegg teaches a fully automated earth-working machine and method of controlling the transverse cross-slope of a leveling implement (32) utilizing multiple sensor systems, such as laser receivers and beacons (12, 10) respectively, in combination with either distance or angle measuring instruments, such as gyroscopes or inertial detectors such as cross slope angle detector (35). Clegg explicitly recites the desirability in combining multiple sensor technologies, in order to take advantage of each systems unique abilities, such that the "interconnection, interaction and interrelationship of such devices is novel and working together, accomplish results not previously accomplished". Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made to provide the method of controlling a leveling device of Hohmann, Jr., with the method of combining cross-slope sensors with laser elevation detectors, in order to maintain a desired, non-horizontal transverse slope of the leveling device, as taught by Clegg, in order to accomplish leveling results not previously accomplished. See Clegg, col. 7, ln. 37-col. 9, ln. 56; col. 10, ln. 49-col. 11, ln. 26.

Unfortunately Clegg does not disclose what types of cross-slope sensors could be utilized to measure and produce a signal representing the cross-slope of the leveling

tool. However, Burgin teaches gravity-based cross-slope sensors are advantageously used with a slope control console, which can be secured to a paver such that the sensor can sense the inclination of a leveling tool, such as a screed head (E), relative to a predetermined slope, since the sensor can be directly attached to the screed head (E). Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made to provide the method of controlling a leveling device, during a column block situation of Hohmann, Jr., with the method steps of providing and attaching a gravity based cross slope sensor directly to a leveling device, as taught by Clegg and Burgin, in order to maintain the cross slope of the leveling device, with respect to a desired cross-slope, such that the level of accuracy (overall smoothness) of the leveled concrete is greater than that previously achievable. See Burgin col. 2, ln. 51-col. 5, ln. 47.

In regards to claim 2 Hohmann, Jr. teaches a known problem exists when laser receivers of a concrete leveling device is blocked from receiving a reference beam. What Hohmann, Jr. does not disclose is providing a gravity based cross slope sensor to measure and store a current transverse grade of the leveling device. However, Clegg teaches the use of a processing system including a cross slope sensor (35) such that the actual cross slope angle, at which the leveling device is grading a surface, being measured by a cross-slope detector (35) the output of which is encoded in digital form in encoder 35a or to a central processing unit for the system shown at (120).

For comparison to a desired final grade of the leveling device at any given point on the site.

Further Burgin teaches a cross slope sensor, in the form of a gravity-based cross slope sensor and method of using said gravity based sensor to measure the transverse slope of a paving device. Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made to provide the method of controlling a leveling device in a column block situation, with the method step of measuring the current cross slope of a leveling device, with a gravity based cross slope sensor as taught by Clegg and Burgin, in order to maximize the smoothness of the leveled concrete.

3. Claims 3-5, 7-11, 13-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hohmann, Jr. # 5,556,226 in view of Clegg # 4,807,131.

Hohmann, Jr. discloses a control system for controlling movement of individual, hydraulically moveable ends (17, 2nd end not numbered) of a screed head (15) so as to maintain a substantially horizontally-level, elevational position between each end of the screed head (15) and an elevational reference (59, 61) as the screed head is moved toward the machine (1). Said control system comprising:

1st and 2nd elevation receivers (51, 53) mounted on respective 1st and 2nd ends and providing signals indicating the position of the 1st and 2nd ends of the screed head (15) in relation to an elevational reference (59, 61).

Hohmann, Jr. further discloses a known problem exists when one of the laser receivers is prevented from receiving the reference laser beam (59).

What Hohmann, Jr. does not disclose is the use of a cross slope sensor and a control circuit responsive to laser receivers and cross slope sensors, to maintain the screed head in an other than horizontal orientation.

However, Clegg teaches a fully automated earth-working machine capable of controlling the transverse cross-slope of a leveling implement (32) utilizing a control circuit (50, 52, 140, 120), which is capable of receiving signals from multiple sensor systems, such as laser receivers and beacons (12, 10) respectively, in combination with either distance or angle measuring instruments, such as gyroscopes or inertial detectors such as cross slope angle detector (35). Such that the signal from the cross slope sensor (35) remains substantially constant; whereby the transverse slope also is maintained substantially constant. Clegg explicitly recites the desirability in combining multiple sensor technologies, to maintain a desired transverse slope of the leveling device, in order to take advantage of each systems unique abilities, such that the "interconnection, interaction and interrelationship of such devices is novel and working together, accomplish results not previously accomplished".

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made to provide the paving machine of Hohmann, Jr. with a cross slope

sensor and control system capable of receiving signals from both laser receivers and cross slope sensors, as taught by Clegg, in order to maintain a desired transverse slope of a leveling device, when one of the sensor systems is not functioning properly; as reasonably suggested by Clegg. See cols. 9-11.

In regards to claims 5, 10 Hohmann, Jr. discloses the claimed invention as put forth with respect to claim 3 above for controlling movement of individual hydraulically moveable ends of a screed head carried by a boom of a machine so as to maintain a horizontal position between each end of the screed head and a reference (59, 61) in a concrete paving application as the screed head is moved toward the machine; but does not disclose utilizing additional sensor systems and control circuit capable of receiving signals from additional sensors. Clegg explicitly recites the desirability in combining multiple sensor technologies, to maintain a desired transverse slope of the leveling device, in order to take advantage of each systems unique abilities, such that the "interconnection, interaction and interrelationship of such devices is novel and working together, accomplish results not previously accomplished". To include the use of relative motion signal generators and inertial detectors, which is seen to include inclinometers. See col. 12, lns. 1-20.

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made to provide the paving machine of Hohmann, Jr. with a cross slope sensor and control system capable of receiving signals from both laser receivers and cross slope sensors, as taught by Clegg, in order to maintain a desired transverse slope of a leveling device, when one of the sensor systems is not functioning properly; as reasonably suggested by Clegg. See cols. 9-11.

In regards to claims 7, 8 Hohmann, Jr. disclose the use of laser beacons and laser receivers.

In regards to claims 13, 15, 16 Hohmann, Jr. discloses a method of controlling the elevational position of hydraulically moveable ends of a tool in relation to a reference detected by elevation receivers (51, 53), such as laser receivers attached to longitudinal ends of the screed head (15), the method comprising:

Selecting a desired elevational position of the screed head (15) with respect to a laser reference beam (59).

Controlling the elevational positions of the ends of the tool using the sensed positions of the ends of the tool in relation to the reference laser beam when both are known.

Hohmann, Jr. further discloses a known problem exists when one of the laser receivers does not receive an elevational reference beam (59).

What Hohmann, Jr. does not disclose are the steps of measuring the positions of the ends of the tool in relation to a reference, and sensing the cross slope of tool. However, Clegg teaches a fully automated earth-working machine and method of controlling the transverse cross-slope of a leveling implement (32) utilizing multiple sensor systems, such as laser receivers and beacons (12, 10) respectively, in combination with a cross slope angle detector (35).

The method comprising the steps of:

Sensing with the elevational receivers (12) the positions of the ends of the tool in relation to a laser reference beam.

Sensing the transverse slope of the tool with a cross slope sensor (35).

Controlling the elevational ends of the tool using at least one signal from a laser receiver (12) and the cross slope sensor signal to maintain the tool in a desired transverse slope.

Further, Clegg explicitly recites the desirability in combining multiple sensor technologies, in order to take advantage of each systems unique abilities, such that the "interconnection, interaction and interrelationship of such devices is novel and working together, accomplish results not previously accomplished". Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made to provide the method of controlling a leveling device of Hohmann, Jr., with the method of combining cross-slope sensors with laser elevation detectors, in order to maintain a desired, non-horizontal transverse slope of the leveling device, as taught by Clegg, in

order to accomplish leveling results not previously accomplished. See Clegg, col. 7, ln. 37-col. 9, ln. 56; col. 10, ln. 49-col. 11, ln. 26.

In regards to Claim 14 Hohmann, Jr. discloses a method of controlling laser-guided screed heads, during a column block situation, wherein during retracting of the screed head on the boom, a laser beacon is known to become blocked from a laser receiver on one of the ends of the screed head. Hohmann, Jr. explicitly discloses "As the screed is moved around the floor (this is seen to include retraction and lateral motion of the boom)...the vertical support columns frequently block the laser beam...and it disrupts the automatic operation of the laser screed...The operator must immediately assume manual height control of the affected screed end when the column block light is illuminated...until the sensor moves into a position where it is unblocked (which is seen to include retraction and lateral motion of the screed head, as is normal operation of the paving machine. Hence, it would have been obvious to the method of controlling a laser guided screed head during a column block situation of Hohmann, Jr. to terminate control of the ends of the screed head and assuming manual control of the screed head, to complete retraction of the screed head, past the building column causing the "blocked sensor" until the sensor moves into a position where it is unblocked, includes retraction and lateral motion of the screed head, since both motions are commonly necessary to clear the blocked sensor. See col. 2, lns. 33-col. 3, ln. 5.

4. Claims 6, 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hohmann, Jr. # 5,556,226 in view of Clegg # 4,807,131 in view of Heiser et al. #4,925,340.

Hohmann, Jr. in view of Clegg discloses a control system of maintaining a non-horizontal orientation of a screed head for forming roads and the like having a desired cross section, to include the desirability to of utilizing combinations of sensor technologies such as laser receivers and gravity-type cross-slope sensors, but does not explicitly recite using a pendulum type cross-slope sensor.

However, Heiser et al. teaches pendulum type cross-slope sensor are commonly used on paving machines, specifically to maintain a desired transverse slope of a leveling device (12) with respect to gravity, and is mounted directly on the leveling device to for maximum accuracy. Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made to provide the paving machine of Hohmann, Jr. in view of Clegg, with a pendulum type cross slope sensor, as taught by Heiser et al., in order to form inclined concrete surfaces, to exacting specifications. See Heiser et al., Figs. 3, 4; Col. 2, ln. 30-col. 3, ln. 44.

Response to Arguments

5. Applicant's arguments filed 3/16/05 have been fully considered but they are not persuasive.

Applicant argues against the objection to claim 2 by stating "to determine what applicants intend a term to mean, a positive limitation from the specification cannot be read into a claim that does not impose that limitation". And further states "claims must be interpreted in view of the specification without importing limitations from the specification into the claims unnecessarily".

To which the Examiner concurs. The issue raised with claim 2 is directed specifically to the scope of the limitation, and in what manner the method steps are performed; as well as what, if any structural features are required to perform the intended method steps; and equivalents of said structural features.

With respect to Claim 2, it is wholly and completely necessary to define the method steps of claim 2, within the context of the Applicant's specification. As written, the method step in claim 2 requiring "Measuring a desired grade with a gravity based cross slope sensor" is vague and unclear as to how the measuring is to be performed, because the claim does not define the "grade" being measured.

Hence, a clear and unambiguous interpretation of the required method step must be put forth, such that the method being claimed can be performed.

Is the method step of claim 2 requiring a concrete surface of said claimed "concrete application" being measured? And if so, what type of "gravity based cross-slope sensor" is required to perform the measuring? How does the "gravity based cross-slope sensor" measure the desired grade? Since that is the method step being claimed?

Hence, the claimed limitations must be examined "in light of the specification". Accordingly, Applicant's specification provides for "the desired grade of the cross slope sensor is measured and stored in memory of the tool's control system...That is, the cross slope sensor provides a relative measurement of the interrupted laser receiver which, when coupled with the absolute measurement of the uninterrupted laser receiver, provides an estimate of the absolute position of the interrupted laser receive(r)". Hence, it is clear that only the cross-slope of the sensor itself, as it relates to the cross-slope of the screed head, is the desired grade being measured and stored; and does not include measuring the grade of the soil at the construction site receiving the concrete being leveled. Hence, the cited phrase from claim 2 should be --measuring the current transverse grade of the gravity-based cross slope sensor; and storing said grade in a memory device of the control system.

See Applicant's specification, particularly page 3 lns. 10-20.

Therefore, the objection is seen as proper and is maintained. Appropriate correction is still required.

Applicant then argues "the specification also states that being on "grade" is a position that indicates by appropriate receipt of the laser beam that the screed head is positioned at the correct height and orientation".

However, the claimed invention should not be interpreted differently with each page of the specification. Applicant is encouraged to clearly indicate which actual method step is being claimed.

Exemplary of the vagueness of the limitations of claim 2, Applicant argues "Additionally, it is common for one skilled in the art to bench a tool to a known position for establishing a desired grade, which can for example, include the ground, a concreted ground segment, a survey's stick, a form, etc.". Most of which are not disclosed by Applicant to be the claimed invention. Hence, it is appropriate during the examination process, to "interpret claim limitations in light of the specification" as has been put forth in the Last Office Action.

Since, Applicant asserts "the term 'desired grade' may also refer to the height and orientation of such a benching location which may be detected by the slope sensor".

It must be pointed out that Applicant's invention is not capable of measuring "the ground, a concreted ground segment, a survey's stick, a form, etc."

As provided for in Applicant's specification " screed head 522 is positioned at the correct height and orientation, the inclinometer 530 would read zero slope, and the algorithm of the slope control system would be relatively simple".

Clearly inclinometer (530), is again measuring the cross slope of the sensor (530) itself, as it relates to the cross-slope of the screed head, is the desired grade being measured and stored; and does not include measuring the grade of the soil at the construction site receiving the concrete being leveled.

Which is how the claimed limitations of Claim 2 have been examined with respect to the prior art of record.

Applicant then argues against the 35 U.S.C. 103(a) rejection of claims 1, 2 as being unpatentable over Hohmann, Jr. '226 in view of Clegg '131 and Burgin '937 by suggesting a *prima facie* case of obviousness has not been made.
Applicant supports the allegation by suggesting "the Examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious"; i.e. a *prima facie* case of obviousness.
Applicant then states "A rejection based on 103 clearly must rest on a factual basis, and these facts must be interpreted without hindsight reconstruction of the invention from the prior art". Applicant further alleges "The Examiner may...resort to speculation, unfounded assumptions, or hindsight reconstruction to supply deficiencies in his required factual basis".

Applicant then addresses the disclosure of the prior art in that "although the above teachings of Clegg and Hohmann Jr. disclose the use of a pair of laser receivers and a slope sensor for positioning a tool, and Bergin and Heiser et al. particular tyes of cross slope sensors, there is absolutely no teaching or suggestion in the cited art that the slope sensor may be used as an alternative sensor upon losing reception by one of the laser receivers, such as in a column block situation, to maintain the position of the tool...Accordingly, as none of the above cited references...teach or suggest all of the

claim limitations the Examiner has failed to establish a *prima facie* case of obviousness.

However, Applicant is directed to the disclosure, by Clegg in Col. 8, lns. 10-15 " Generally speaking, however, it is desirable to use two or three types of signal generating devices, taking advantage of the particular precision and flexibility of each. Distance from reference points may be determined, for example, using electronic distance measuring devices which rely upon infrared or other radiation reflection.

Hence, Clegg alone provides a *self-supporting* case of obviousness, by providing specific and concise motivation to "use two or three types of signal generating devices, taking advantage of the particular precision and flexibility of each. Obviously, one of ordinary skill in the art, is aware of "column block" situations and the need to "maintain a desired grade of a grading implement" during such situations. Further, in light of the disclosure of Clegg, it would be obvious to provide a different technology(ies) capable of maintaining a desired grade of a grading implement while a laser receiving is blocked from receiving a reference laser beacon. Burgin and Heiser et al. both discloses method steps by which the cross slope of a grading device is maintained by a cross slope sensor of varying types, such as pendulum type, gravity based, cross slope sensors.

Although the rejections of the Last Office Action only exemplified the use of 2 different technologies, it is noted Clegg does provide explicitly motivation for using up to 3 different technologies to control the grading machine.

Therefore, Applicant's arguments are not persuasive and the rejection is maintained.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond Addie whose telephone number is (571) 272-6986. The examiner can normally be reached on Monday-Saturday from 7:00 am to 2:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas B. Will, can be reached on (571) 272-6998.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Thomas Will
Supervisory Patent Examiner
Group 3600

5/18/05